Journal of Clinical Gastroenterology and Hepatology
ISSN: 2575-7733

Open access Research Article

Nutritional Assessment of Non Hospitalized Patients with Liver Cirrhosis in 04 Reference Hospitals in Cameroon

Winnie Tatiana Bekolo Nga[1,2*], Servais A. F. Eloumou Bagnaka[2], Antonin Wilson Ndjitoyap Ndam[3], Atangana Offiala[2], Agnès Malongue[1], Christian Tzeuton[4], Dominique Noah Noah[2], Oudou Njoya[3], Firmin Ankouane Andoulo[3], Luma H. Namme[1]

[1]*Department of Internal Medicine, Douala General Hospital, Douala*
[2]*Department of Medicine and Pharmaceutical Sciences, University of Douala, Douala*
[3]*Department of Medicine and Biomedical Sciences, University of Yaoundé, Douala*
[4]*Department of Internal Medicine, Capucines Clinic, Douala*

ABSTRACT

Introduction: Protein energy malnutrition is a common complication and a factor of morbidity and mortality in cirrhosis. Our study aimed to determine the prevalence of malnutrition in Cameroonian cirrhotic patients.

Methodology: This was a cross-sectional study from December 15, 2019, to April 15, 2020. It was framed at 04 hospitals in Douala and Yaoundé. We included patients with cirrhosis aged over 18 who agreed to participate. The data collected were clinical and paraclinical. Subjective Global Assessment (SGA), triceps skinfold (TSF), and arm muscle circumference (AMC) were used for nutritional assessment. The associated factors were sought by univariate and multivariate analyses. The significance level was set at 0.05.

Results: 75 patients agreed to participate in our study. The average age was 56 ± 15.8 years. The male gender accounted for 52% (N=39) of the patients. The most common etiologie was viral hepatitis B in 50.67% (N=38). The most frequent clinical signs were early satiety (N=47), ascitis (N=40). The Child-Pugh score was C in 21.3% (N=16). The prevalence of malnutrition was 46.6% (N=35), 60% (N=45) and 94.7% (N=71) according to SGA, AMC and TSF respectively. The factors associated with malnutrition are a Child-pugh C score (p=0.00), recent hospitalization (p=0.03), anorexia (p=0.00), ascites (p=0.003), hypoalbuminemia (p=0.00) and elevated serum creatinine (p=0.00).

Conclusion: The prevalence of malnutrition was 46.6%, 60%, and 94.7% respectively according to SGA, AMC, TSF. The factors associated with malnutrition are recent hospitalization, anorexia, ascites, the Child-Pugh C score, hypoalbuminemia, and high creatinine.

Keywords: Cirrhosis; Malnutrition; TSF; AMC; SGA

INTRODUCTION

Cirrhosis is defined by diffuse disorganization of the hepatic architecture, with annular fibrosis delimiting hepatocyte nodules in clusters, called regeneration nodules [1]. The prevalence varies from one region to another in the world, between 0.15% and 0.6% of the general population [1]. The main etiologies of cirrhosis are alcohol, viral hepatitis, NASH, other metabolic diseases (Wilson's disease, hemochromatosis), autoimmune hepatitis, cholangiopathy, and Budd Chiari syndrome [1,2]. In Cameroon, the main etiologies remain viral hepatitis B and C whose respective prevalences are 11.9% and 6.5% [3-6]. Cirrhosis is associated with significant morbidity and mortality related its complications [7-9]. Among these complications is undernu-

Received:	07-February-2022	**Manuscript No:**	IPJCGH-22-12575
Editor assigned:	09-February-2022	**PreQC No:**	IPJCGH-22-12575 (PQ)
Reviewed:	23-February-2022	**QC No:**	IPJCGH-22-12575
Revised:	28-February-2022	**Manuscript No:**	IPJCGH-22-12575 (R)
Published:	07-March-2022	**DOI:**	10.36648/2575-7733.6.3.15

Corresponding author Winnie Tatiana Bekolo Nga, Department of Internal Medicine, Douala General Hospital, Douala, Tel: +237650835106; E-mail: winbek@yahoo.fr

Citation Bekolo Nga WT, Eloumou Bagnaka SAF, Ndjitoyap Ndam AW, Offiala A, Malongue A, et al. (2022) Nutritional Assessment of Non Hospitalized Patients with Liver Cirrhosis in 04 Reference Hospitals in Cameroon J Clin Gastroenterol Hepatol. 6:15.

trition, which is defined by the state of the body in nutritional imbalance with a negative energy and/or protein balance [7-9]. Nutritional status is an important predictor of morbidity and mortality in cirrhotic patients although often neglected when managing concomitant medical problems in these patients. Twenty percent of patients with compensated cirrhosis present with malnutrition and its prevalence is 60% in patients with a Child-Pugh score classified as C [9]. The nutritional assessment of cirrhotic patients is done using the SGA (Subjective Global Assessment) which is a questionnaire; by anthropometric parameters (weight, BMI, triceps skinfold, arrm circumference and arm muscle circumference), by Bioelectrical Impedance Analysis (BIA), Dexa-CT [9-11].

In a study by Carvalho et al in 2006 in Brazil, malnutrition was estimated at 46% according to the SGA score [12]. In Tunisia, Medhioub et al used both SGA and anthropometric parameters to determine the prevalence of malnutrition, and it was 47% [13]. Among the anthropometric parameters, the triceps skinfold (TSF) or the arm muscle circumference (AMC) are very often used. They were used by Kouassi et al in Togo, who found a prevalence ranging from 52% to 82.5% depending on the assessment method used [14]. In Cameroon, in a study conducted in the city of Yaoundé in 2018, the prevalence of malnutrition was estimated at 66.7% according to the AMC, 77.8% with the TSF and 9.8% with the BMI [15]. To have exhaustive and refined data concerning the nutritional status of cirrhotic patients in Cameroon, we conducted a study in different public hospital structures in the cities of Douala and Yaoundé.

PATIENTS AND METHODS

We conducted a cross-sectional and analytical study over 5 months from December 2019 to April 2020. We chose different hospitals in Douala and Yaoundé as study sites. We included all patients over 18 years of age with cirrhosis, whatever the etiology; whose diagnosis was made either by a liver biopsy or by indirect markers (Fibroscan, Fibrotest/Actitest, Fib4, Apri score, NAFLD Fibrosis score); and with or without treatment of the cirrhosis etiology. We excluded patients with hepatocellular carcinoma or any other neoplasia. The minimum sample size was calculated using the Lorentz formula and was estimated at 49 patients. The data collected were sociodemographic (age, sex), comorbidities (hypertension, diabetes, alcohol intake, and smoking), etiology of cirrhosis, anthropometric parameters, clinical presentation (ascites, edema of the lower limbs, hepatomegaly, hepatic encephalopathy), biological data (full blood count, transaminase level, prothrombin time, total bilirubinemia, serum albumin, and protein levels, uremia, creatininemia, calcemia, natremia, and potassium). After consenting to participate in the study, each patient was interviewed and examined. The biological data were collected in each patient's medical record and must have been done during our study period. Anthropometric parameters (height, weight, arm circumference, triceps skinfold) were taken by us. For weight, the patient, once rid of bulky devices and objects, stood vertically on the tared scale, looking at the horizon, arms stretched along the body. Height was measured using an adult wall height chart, with the patient lying down with his arms extended along his body, looking towards the horizon. The body mass index (BMI) was obtained by taking the ratio of the weight to the normal square height (18-25 kg/m^2). The triceps skinfold (TSF) was measured using a manual Harpenden forceps on the posterior side of the arm, midway between the acromion and the radius; the arm attached to the thorax forming an angle of 45° with the forearm, the standard norm is 10 mm. Arm circumference (AC) was measured as the circumference of the arm halfway between the shoulder and the elbow, in the middle of the biceps brachii. An ordinary tape measure was used to carry out this act.

The arm muscle circumference (AMC) was obtained by applying the following formula:

AMC (cm)=AC (cm)-0.314(TSF in mm) Norm: 23.5 cm.

Subjective Global Assessment (SGA), triceps skinfold (TSF), and arm muscle circumference (AMC) were used for nutritional assessment. The factors associated with under nutrition evaluated according to the SGA score were sought using univariate and multivariate analyses. The significance level was set at 0.05.

Operational Terms

Good nutritional status: According to SGA: when there is no change in food intake; weight loss <5%; absence or minimal presence of symptoms impairing oral food intake; no deficit in fat or muscle mass-TSF ≥ 10 mm-AMC>22 cm.

Malnutrition: It is a pathological condition resulting from insufficient nutritional intake with regards to the body's energy expenditure.

Mild to moderate malnutrition: According to SGA: Weight loss >5%-10% in the previous 6 months or >10%-20% beyond the previous 6 months; BMI<20 for those under 70 and <22 for those over 70; reduction in mild to moderate muscle mass, quantified by a validated technique -TSF between 6 and 9 mm, AMC between 15 and 22 cm.

Severe malnutrition: According to SGA: Weight loss >10% in the previous 6 months or >20% beyond the previous 6 months; BMI<18.5 for those under 70 and <20 for those over 70; Severe reduction in muscle mass, quantified by a validated technique -TSF<6 mm, -AMC<15 cm.

Statistics Analysis

We calculated the minimum sample size using the Lorentz Formula. We used the prevalence found by Bossali et al in Pointe Noire in Congo in 2015 which was 3.2% [16]. The minimum sample size was estimated at 49 patients. Data collected were analyzed using SPSS version 26 software. Fischer's chi-square test was used to determine associations for univariate analyses. Logistic regression was used for multivariate analyzes to determine factors associated with malnutrition. The significance threshold was p<0.05.

Ethical Considerations

An ethical clearance was obtained from the institutional human health research ethics committee of the University of Douala bearing the number N°2161CEI-UDo/07/2020/T, as well as from each institutional research ethics committee of each of the different health structures. Each patient, after learning about the purpose and progress of the study through an explanatory

sheet, had to submit an informed consent form. Each patient Data confidentiality was respected by assigning a specific code to each data collection form; the exploitation of the data was carried out for a purely and strictly scientific purpose. All procedures were performed in accordance with relevant guidelines.

RESULTS

We included 75 patients, 39 men, and 36 women, a sex ratio of 1.08. The average age of the patients was 56 ± 15.8 years. The main etiologies of cirrhosis were viral hepatitis B (38 patients or 50.7%) and viral hepatitis C (36 patients or 48%). Regarding the severity of cirrhosis, 30 patients or 40% had a Child-Pugh score classified A, and 16 patients or 21.3% had a score classified C (Table 1).

Table 1: Characteristics of the study population.

Parameters	Population n=75 (%)
Mean age (années)	56 ± 15,8
Sex	
Female	36 (48)
Male	39 (52)
Etiologies of cirrhosis	
Alcool	01 (1.3)
Hepatitis B	36(48)
Hepatitis C	38 (50.7)
Comorbidities and lifestyle	
Hypertension	14 (18.7)
Diabetes	08 (10.7)
Alcohol	22 (29.3)
Child Pugh Score	
A	30 (40)
B	29 (38,7)
C	16 (21.3)

The prevalence of malnutrition according to SGA score, AMC and TSF was respectively 46.7% (35 patients), 60% (45 patients), and 94.7% (71 patients) (Figure 1). This malnutrition was severe in 14.7% (11 patients), 2.7% (02 patients), and 18.7% (14 patients) of the cases respectively according to the SGA score, the AMC, and the TSF (Figure 1). The main clinical signs presented by patients with severe malnutrition were ascites (09 patients/11), early satiety (09 patients/11), anorexia (08 patients/11), edema of the lower limbs (05 patients/11) and jaundice (06 patients/11) (Table 1). Regarding the anthropometric parameters of patients with severe malnutrition according to the SGA score; the average weight was 51.7 ± 10.6 kg, average BMI was 18.9 ± 2.5, average arm circumference of 19.5 ± 2.9 cm, mean arm muscle circumference was 18.2 ± 2.6 cm, mean triceps skinfold was 4.1 ± 1.4 mm (Table 2). Biologically, they had a mean hemoglobin level of 9.7 ± 1.7 g/dl, mean platelet count was 126.2.103 ± 61.3.103/mm^3, mean TP was 51.6 ± 16.2%, average serum albumin of 28.8 ± 6.3 g/l, and average serum creatinine of 23.9 ± 17.3 mg/l (Table 2).

Figure 1: Prevalence of Malnutrition according to the SGA score, and anthropometric parameters (AMC=arm muscle circumference, TSF=triceps skinfold)

Table 2: Clinical and paraclinical characteristics according to nutritional status according to the SGA Score

	Population of study (n=75)(5)	Good Nutritional status (n=40)	Mild to moderate Malnutrition (n=24)	Severe Undernutrition (n=11)
		Child pugh Score		
A	30	26	2	2
B	29	12	14	6
C	16	2	8	3
		Anthropometric Parameters		
Mean Weight (Kg)	66.8 ± 14.2	72.2 ± 13.9	64.6 ± 10.3	51.7 ± 10.6
Mean BMI	23.6 ± 4.3	25.5 ± 4.4	22.7 ± 3	18.9 ± 2.5
Mean Arm Circumferene (cm)	24.3 ± 5	26.4 ± 5	22.8 ± 3.7	19.5 ± 2.9
Mean AMC (cm)	22.4 ± 4.6	24.3 ± 4.5	21.2 ± 3.6	18.2 ± 2.6
Mean TSF (mm)	6 ± 1.9	7 ± 1.7	5.3 ± 1.5	4.1 ± 1.4
		Clinical signs		
Early satiety	47	19	19	9
Ascites	40	10	21	9
Anorexia	35	11	16	8
Lower limb edema	32	14	13	5
Jaundice	27	9	12	6

Biological Parameter				
Mean Hemoglobin (g/dl)	11.1 ± 2.3	11.5 ± 2.1	10.1 ± 2.6	9.7 ± 1.7
Mean Platelet rate (10^3/ mm^3)	136.4 ± 79.9	184.7 ± 139.7	131.3 ± 65.9	126.2 ± 61.3
Mean PT (%)	58.3 ± 15.6	64.5 ± 14.8	50.9 ± 12.4	51.6 ± 16.2
Mean serum albumin (g/l)	32.2 ± 8.2	35 ± 9.1	29.2 ± 5.5	28.8 ± 6.3
AST (UI/l)	91.9 ± 100.8	76.9 ± 79.6	108.4 ± 115.2	110.4 ± 134.2
ALT (UI/l)	73.6 ± 74.9	64 ± 73.5	80.5 ± 73.1	93.6 ± 84.8
Mean Total Bilirubinemia (mg/l)	32.8 ± 37.5	22.8 ± 13.4	40.9 ± 45.3	51.8 ± 63.7
Mean serum creatinine (mg/l)	18.5 ± 20.7	14.9 ± 20.5	22.1 ± 22	23.9 ± 17.3
Na+ (mmol/l)	136 ± 6	137.2 ± 3.9	135.4 ± 7.2	133 ± 8.4
K+ (mmol/l)	3.8 ± 0.6	3.8 ± 0.3	4 ± 0.6	3.8 ± 1

The factors associated with malnutrition according to the SGA score were a Child-pugh C score (p=0.00; OR 10.21 [95% CI: 1.23-53.91]), recent hospitalization >5 days (p=0.03; OR 10.1 [95% CI: 2.7-110.6]), anorexia (p=0.00; OR 4.3 [95% CI: 2-11.8]), the presence ascites (p=0.003; OR 20.7 [95% CI: 5.8-101.2]), hypoalbuminemia (p=0.00; OR 3.3 [95% CI: 0.9-73]) and serum creatinine greater than 12 mg/l (p=0.00; OR 4.5 [95% CI: 1.3-10.3]) (**Table 3**).

Table 3: Risk factors associated to Undernutrition according to SGA score

Risk Factors	OR (CI 95%)	P value
Recent Hospitalization >5 days	10,06 (2,69 – 110,61)	0,03138
Anorexia	4,32 (2,01 – 11,78)	0,00041
Ascites	20,74 (5,82 – 101,19)	0,00333
Serum albumin<35g/l	3,29 (0,91 – 73,01)	0,00000
Child Pugh C	10,21 (1,23 – 53,91)	0,00000
Serum creatinine >12g/dl	4,45 (1,29 – 10,322)	0,00000

DISCUSSION

Malnutrition is an important factor in morbidity and mortality in cirrhotic patients [8-10]. It is often underestimated in our context and put in the background of other complications of cirrhosis. We were able to observe during our study that almost half of the cirrhotic patients had malnutrition. This prevalence increased considerably depending on the evaluation method used, going from simple to double, especially when anthropometric parameters were used. This significant difference between the evaluation scores for cirrhosis is explained by the fact that the SGA score which is the most used is a subjective evaluation based on an interview with the patient and has been validated for the nutritional evaluation of the cirrhotic patient. It has a sensitivity of 22% and underestimates nutritional status in 57% of cases as demonstrated by Figueiredo et al [15]. Thus, for this evaluation to be complete, the SGA score must be associated with other clinical and paraclinical elements. As clinical parameters, we have the anthropometric parameters including the triceps skinfold (TSF) and the brachial muscle circumference (AMC) which evaluate the muscle mass and the adipose tissue of the patient. In addition, they have the advantage of being easily achievable by practitioners. Undernutrition during cirrhosis is characterized by a loss of adipose tissue but also of muscle mass, these two scores better reflect the reality of the nutritional status of cirrhotic patients [8,10,15-17].

Malnourished patients most often presented clinical signs related to decompensation of cirrhosis, because most patients with undernutrition had a Child Pugh score classified at least B. In addition, Malnutrition, often underdiagnosed or underestimated by practitioners, is more marked in patients with decompensated disease due to the loss of their liver functions. Despite a high prevalence of malnutrition, the mean BMI of the patients indicated that their weight was normal. This confirms that the BMI cannot be used in cirrhotic patients, particularly in the case of oedemato-ascitis syndrome, because the patient's weight is distorted due to fluid and sodium retention [15]. The low TSF and AMC of patients with malnutrition reflects a significant loss of adipose tissue as well as common muscle mass during cirrhosis and is related loss of certain metabolic functions [17,18]. There is a notable difference between these two scores during the evaluation of severe malnutrition because the triceps skin fold (TSF) evaluates the loss of adipose tissue which is eliminated first in the event of a reduction in nutritional intake, muscle wasting that reflects AMC is much later [10,18]. The loss of metabolic functions of the liver is also visible biologically and this was reflected in our patients by hypoalbuminemia.

Several factors were involved in the occurrence of malnutrition in cirrhotic patients. First, a decompensated disease that significantly impairs nutrient metabolism was a factor associated with malnutrition as described in the literature [9-16,18]. As another factor, a recent hospitalization contributed to the installation of malnutrition because the patient who is in a rather stressful environment and different from the usual one, will tend to not have the same eating habits and sometimes to undernourish. To this we can add the presence of ascites and anorexia which strongly contribute to the reduction of ingestion and consequently to the occurrence of malnutrition [11]. Finally, the association with other comorbidities such as impaired renal function easily contributes to the occurrence of malnutrition.

CONCLUSION

Nutrition is an important element in the management of cirrhotic patients. It requires a clinical but also para-clinical evaluation of the patients. Several scores (SGA) and/or parameters are used to assess the nutritional status of patients, the most

convincing of which seem to be the triceps skinfold (TSF) and the arm muscle circumference (AMC). The latter as well as the SGA score are easily achievable in current practice. Decompensated cirrhosis, recent hospitalization, the presence of ascites, anorexia and impaired renal function strongly contribute to the deterioration of the nutritional status of cirrhotic patients.

REFERENCES

1. Philipe L, Marc B, Guillaume C, Patrice C (2009) College of Universities in Hepato-Gastro-Enterology. Beaujon 4:191-208.
2. Hagstrom H, Lindfors A, Holmer M, Bengtsson B, Bjorkstrom K, et al. (2021) Etiologies and outcomes of cirrhosis in a large contemporary cohort. Scand J of Gastroenterol, 56:6
3. Bigna J, Amougou M, Asangbeh S, Kenne A, Noumegni S, et al. (2017) Seroprevalence of hepatitis B virus infection in Cameroon: Asystematic review and meta-analysis. BMJ Open. 7(6):e015298
4. Bigna J, Amougou A, Asangbeh SL, Kenne AM (2017) Seroprevalence of hepatitis C virus infection in Cameroon: A systematic review and metaanalysis. BMJ Open. 7(8):e0157487
5. Biwole-Sida M, Noah D, Eloumou S, Dang L, Talla P, et al. (2015) Prevalence of anti-HCV antibody carriage in a population of workers (screening in the workplace) in Cameroon. J Afr Hepato-Gastrol. 9: 26-29.
6. Ankouane F, Noah D, Atangana M, Kamgaing R, Guekam P, et al. (2016) Seroprevalence of hepatitis B and C virus, HIV-1/2 and syphilis among blood donors in the Yaounde Central Hospital in the center region of Cameroon. Transfus Clin Biol. 23: 72-79
7. Delarue J, Joly F, Desport JC, Fontaine E (2018) New diagnostic criteria for undernutrition in adults. JNDES con. 3: 60-64.
8. Periyalwar P, Dasarath S (2012) Malnutrition in Cirrhosis: Contribution ans consequences of Sarcopenia on Metabolic and Clinical Responses. Clin Liver Dis. 16 (1): 95-131
9. Merli M, Berzigotti A (2019) EASL clinical practice guidelines on nutrition in chronic liver disease. J Hepatol. 70(1):172-193
10. Fernandes S, Mattos A, Tovo C, Marroni C (2016) Nutritional evaluation in cirrhosis: Emphasis on the phase angle. W J H. 8(29):1205-1211
11. Dupont B, Eloumou S, Piquet M (2011) Nutrition in the cirrhotic. Nutr Clin Metab. 25(3) :172-6.
12. Carvalho L, Parise ER. Evaluation of nutritional status of nonhospitalized patients with Liver Cirrhosis. Arq Gastroenterol 43(4): 269- 274
13. Medhioub M, Hamzoui ML, Jardak S, Khsiba A (2017) Assessment of nutritional status in cirrhotics. Rev .Med. Inter. 43 : (S2).
14. Nkili A (2018) Prevalence of undernutrition in cirrhotics in 3 hospitals. Biomed Sci. 49 : 8-56.
15. Figueiredo FA, Perez RM, Freitas MM, Kondo M (2006) Comparison of three methods of nutritional assessment in liver cirrhosis: subjective global assessment, traditional nutritional parameters, and body composition analysis. J Gastroenterol. 41:476–482
16. Bossali F, Deby G, Atipo-Ibara B (2015) Two-year survival of cirrhotics followed in Pointe-Noire from 2005 to 2014. J Afr Hepato Gastroenterol. 9: 39–43 .
17. Julia T, Reiss L, Aliwa B, Staudlbauer V (2021) Malnutrition in patients with Liver Cirrhosis. Nutrients 13(2): 540
18. Chapman B, Sinclair M, Gow PJ, Testro AG (2020) Malnutrition in Cirrhosis: More food for thought. World J Hepatol. 12(11): 883–896